TOPIC: CARDIAC CYCLE

Systole, Diastole, Pressure, & Valves

- **Cardiac Cycle**: cycle of contraction and relaxation that moves blood through the heart.
  - **Systole**: contraction.
  - **Diastole**: relaxation.

Systole = squeeze.

Diastole = pressure drops.

- Changes in pressure force valves open and closed.
  - The ventricles cause most of the pressure change.
  - *Recall*: Atrioventricular (AV) valve = "in valve"; Semilunar (SL) valve = "out" valve

AVinSLout

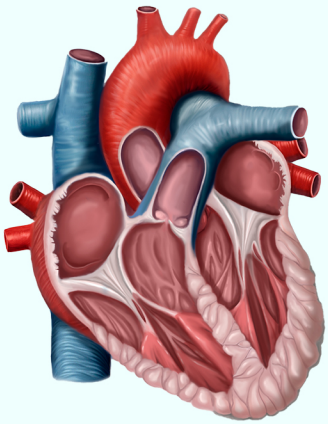
- Ventricular Systole - pressure ↑:
  1. AV valve close.
  2. Semilunar valve opens.

- Ventricular Diastole - pressure ↓:
  3. Semilunar valve closes.
  4. AV valve opens.

EXAMPLE

The opening and closing of heart valves is due to the relative pressure in the ventricles compared to the atria and the arteries. Use your knowledge of heart anatomy to complete the following table.

Relative pressure	Valve affected?	Is valve open or closed?	Ventricle in Systole or Diastole?
Aorta > Left Ventricle	Left S.L. / Aortic	closed	diastole
Right atrium > Right Ventricle	R. A.V. valve/ tricuspid	Open	diastole
Left Atrium < Left Ventricle	L. A.V. valve/ mitral	closed	systole
Pulmonary Artery < Right Ventricle	R. S.L. valve pulmonary	open	systole

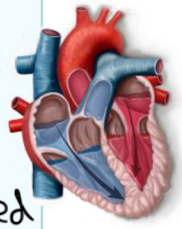


TOPIC: CARDIAC CYCLE

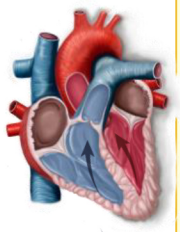
Events in the Cardiac Cycle

- 4 **events in the cardiac cycle:**
  - Based on: 1) whether ventricles are in systole or diastole & 2) whether blood is _____.

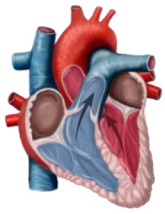
A) Ventricular filling
Blood flows through the atria into the ventricles.
Ventricles: diastole
Ventricular pressure: low
AV valves: open **SL valves:** closed



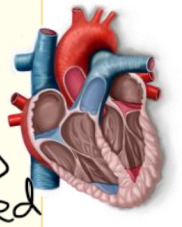
B) Isovolumetric contraction
Blood contained in the ventricles as they contract.
Ventricles: systole
Ventricular pressure: rising
AV valves: closed **SL valves:** closed



C) Ventricular ejection
Blood flows into the aorta and pulmonary trunk.
Ventricles: systole
Ventricular pressure: high
AV valves: closed **SL valves:** open



D) Isovolumetric relaxation
Ventricles relax, no movement of blood in the heart.
Ventricles: diastole
Ventricular pressure: falling
AV valves: closed **SL valves:** closed



EXAMPLE

The steps of the cardiac cycle are described below. Match each description below with the phase of the cardiac cycle it describes.

a) Both sets of valves are closed. Atria in diastole, ventricles in diastole.

b) AV valves are open, semilunar valves are closed. Atria in systole, ventricles in diastole.

c) Both sets of valves are closed. Atria in diastole, ventricles in systole.

d) AV valves are closed, semilunar valves are open. Atria in diastole, ventricles in systole.

Ventricular Filling: b
Isovolumetric Contraction: c
Ventricular Ejection: d
Isovolumetric Relaxation: a